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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/528,333

06/02/2005

Joosten Connemann

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EXAMINER

CUTLIFF, YATE KAI RENE

ART UNIT

PAPER NUMBER

1621

MAIL DATE

DELIVERY MODE

06/19/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/528,333	Applicant(s) CONNEMANN ET AL.	
	Examiner YATE K. CUTLIFF	Art Unit 1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,9,10,12,14-17,20-24,29,30,32,33,35,36,40,42 and 49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,9,10,12,14-17,20-24,29,30,32,33,35,36,40,42 and 49 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :3/18/2005, 7/5/2005, 10/16/2006.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1, 14, 23, 24, 40 and 49 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Claim 1 recites the limitation "the first esterification mixture" in line 8, and "the conveying agent" in line 16. There is insufficient antecedent basis for this limitation in the claim.
4. Claim 14 recites the limitation "the preceding column" in line 3. There is insufficient antecedent basis for this limitation in the claim.
5. Claim 23 recites the limitation "the extraction step" in lines 4-5; and "the extraction column" in line 5. There is insufficient antecedent basis for this limitation in the claim.
6. Claim 24 recites the limitation "the extraction column" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.
7. Claim 40 recites the limitation "the pre-purified transesterification mixture" in line 3. There is insufficient antecedent basis for this limitation in the claim.
8. Claim 49 recites the limitation "the rectification device" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 1-4, 9, 10, 12, 14-17, 20-24, 29, 30, 32, 33, 35, 36, 40, 42 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lepper et al. (US 4,608,202) in view of Energea-Umwelttechnologie GMBH (WO 2002038529) (Energea),

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Canakci et al. (American society of Agricultural Engineers 2001) (Canakci 1), Canakci et al. (ASAE Paper no. 016049, 1001) Canakci (2), and Metallgesellschaft AG (EP 0523767) (Metall).

13. The rejected claims cover, inter alia, a process for the non-pressurized method for the continuous production of alkyl esters of higher fatty acids from fatty acid triglyceride starting mixtures containing free fatty acids, including an integrated combination of acid esterification and basic transesterification, said method comprising: at least one esterification of free fatty acids in a separate esterification device; a partial purification of the first esterification mixture; transesterification of the fatty acid triglycerides, carried out twice in separate transesterification devices; purification of the transesterification mixture; and converting the acid and base catalyst from esterification and transesterification to a salt suitable for use as a fertilizer. The dependent claims limiting the fatty acid triglyceride starting mixture; modifying the esterification step; the transesterification step; limiting the acid and base catalyst; limiting the alcohol used in the reaction process; , and modifying and describing various purification steps or process step.

14. Lepper et al. discloses a two phase process for the manufacture of fatty acid esters from natural fats and oils containing free fatty acids that includes: preliminary-esterification in the presence of a monoalcohol, acid catalyst and entraining agent (dragging agent) of glycerol; phase separation into an entraining agent phase containing the acidic catalyst, water of reaction and remaining monoalcohol, and a treated oil phase; subjecting the treated oil phase to transesterification. Further, removal of the

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water from the entraining agent phase and recycling the dry entraining agent phase containing the acid catalyst back to a further preliminary esterification step. (see column 3 lines 57-68 & column 4, lines 1-18, 68, & column 5 line 1). In the Lepper et al. reactions, esterification and transesterification, are conducted at temperatures between 40 and 120°C. (see Example 1). The preferred monoalcohols are C1-C4, in particular methanol. (see column 4 lines 32-40). The acid catalyst use in the preliminary esterification step may be organic sulfonic acids derivatives such as, toluene sulfonic acid; or sulfuric acid. (see column 5, lines 10-22). The esterification reaction pressure is no higher than 5 bars and there is no need for a pressure reactor. (see column 4 line 50-54). The transesterification reaction is under pressureless conditions. (see column 2 lines 1-5). The transesterification reaction uses an alkaline catalyst, such as sodium methylate, and the methyl ester phase of the transesterification reaction was washed with water for purification. (see Example 1).

Lepper et al. fails to disclose the following: i) use of the recovered acid and base catalyst to form a salt useful for fertilizer; ii) esterification of the free fatty acids 2-8 times; iii) carrying out transesterification at least twice; iv) free fatty acid start mixtures having a free fatty acid content of 0 to 100%; and v) the multitude of components used in a continuous manufacturing process such as, esterification devices (consisting of a plurality of columns, transesterification devices (consisting of a plurality of columns), a rectification device and a separator.

However, with regard to the use of the recovered catalyst as fertilizer, Energea discloses a process for preparing fatty acid esters by concentrated sulfuric acid catalyst

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esterification and transesterification of the esterification oil phase with a potassium hydroxide catalyst; where the acid and base catalyst by products make a salt that is suitable for use in agricultural fertilizer. (see abstract).

With regard to esterifying the free fatty acids 2-8 times, Canakci (1) discloses that in the development of their two-step pre-esterification process for making methyl esters, if the free fatty acid level is high multi-step processing could be used. Specifically, usually two pretreatment (pre-esterification) steps are needed; the sequence can be repeated as many times as necessary to reduce the acid level. (see column 1, first full paragraph & column 2 lines 1-21).

With regard to conducting subjecting the fatty acid triglycerides, produced by the esterification reactions, to transesterification at least twice, Canakici (2) discloses a process for producing alkyl monoesters of fatty acids from vegetable oils or animal fats, which includes a pretreatment esterification step and a transesterification step. (see abstract). The pretreatment reaction uses an acid catalyst and is conducted in two or more steps with a separation process between the pre-treatment steps to remove water formed during the reaction. (see page 3 last paragraph). The process contemplates start products having free fatty acid levels from soybean oil with low free fatty acid content to brown grease having a free fatty acid content of 40%. (see abstract). Additionally, it discloses that if at the end of the transesterification step the alkyl ester product has excessive total glycerine level, a second transesterification step can be used to lower the total glycerin level in the methyl ester. (see page 9, first full paragraph).

Lastly, with regard to the multitude of components multitude of components set out in the claims, such as the esterification devices (consisting of a plurality of columns, the transesterification devices (consisting of a plurality of columns), a rectification device and a separator, these features are present in the device of Metall. The device of Metall includes mixing reactors (esterification device, transesterification device), a separator, and extractor and a rectifying column.

It would have been obvious to one of ordinary skill in the art to include a pre-esterification step to reduce the free fatty acid in a fatty acid triglyceride (natural oil or waste oil) prior to transesterification as suggested by Leeper, and if necessary to further lower the free fatty acid to use multiple esterification steps as suggested by Canakci (1); then in order to reduce the glycerin level in the alkyl ester produced by the transesterification of the oil of the esterification process, it would have been obvious to use a second transesterification step as suggested by Canakci (2); and to use the recovered acid and base catalyst salt formed as a fertilizer as suggested by Energea, in a process for the continuous production of alkyl esters as in the instant invention.

One of ordinary skill in the art would have been motivated to do this because of the desire to create and high grade alkyl ester suitable for use as biodiesel and to make the process environmentally friendly.

Therefore, the invention as a whole was *prima facie* obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YATE K. CUTLIFF whose telephone number is (571)272-9067. The examiner can normally be reached on M-TH 8:30 a.m. - 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yvonne Eyler can be reached on (571) 272 - 0871. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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